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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/809,548	03/15/2001	Steven H. Reichman	RL-1970	5475

7590 10/25/2005  
Allegheny Technologies Incorporated  
1000 Six PPG Place  
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EXAMINER
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JOHNSON, STEPHEN

ART UNIT	PAPER NUMBER
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3641

DATE MAILED: 10/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/809,548	REICHMAN, STEVEN H.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Stephen M. Johnson	3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-14,16-19,21-23,45,46 and 55-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-11,16-19,21-23,45,46 and 55-58 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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1. Claims 1, 4-6, 9-11, 17-18, 45-46, and 55-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jardine in view of Ashmead.

Jardine discloses an armor comprising :

- a) at least one energy absorbing layer that is a shape memory alloy; Ti Ni or TiO<sub>2</sub> layer; col. 4, lines 3-10
- b) at least one second layer of a metallic material; col. 6, lines 8-28
- c) adhesively bonding to the at least one energy absorbing layer; col. 6, lines 57-60
- d) a third plate of a metallic material; and col. 6, lines 8-28
- e) a vehicle. col. 1, lines 5-21

Jardine applies as previously recited above. However, undisclosed is a means for attaching the sheets together that is welding. Ashmead teaches a means for attaching sheets together that is welding (col. 3, lines 7-12). Applicant is substituting one attachment means for another in an analogous art setting as explicitly encouraged by the secondary reference (see col. 3, lines 7-12 and 62-64 of Ashmead). It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Ashmead to the Jardine disclosure and have a means for attaching the plates that is welding.

2. Applicant's arguments are addressed as follows. Applicant's argument that the second layer of material (PZT layer) is a ceramic layer and not a metallic layer as claimed is well taken. However, the TiNi and TiO<sub>2</sub> layers of Jardine are also contiguously bonded to other layers that are metallic layers (see col. 6, lines 8-28 of Jardine). With regard to the argument that Jardine fails to teach metallurgically bonding one layer to another, Ashmed and not Jardine is being

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relied upon to meet this claim limitation. However, these contiguous layers must be bonded together in some fashion or the layers would separate upon impact with the acoustic and shock waves and the Jardine device would not be operable.

It is further argued that a ceramic layer would not be combined with a metallic layer by welding. This is accurate. However, please note col. 6, lines 8-28 of Jardine. The metallic layers included consist of aluminum, titanium, Nitinol, and copper and these are appropriately combined by welding. With regard to the argument that Jardine fails to teach a third plate of metallic material, this third plate could be either the plate of TiO<sub>2</sub> or the attached layer of aluminum, titanium, or Nitinol (see col. 6, lines 8-16).

3. Claims 7-8, 19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jardine in view of Ashmead as applied to claims 1, 4-6, 9-11, 17-18, 56, and 58 above, and further in view of Jackson et al. or Buehler et al..

Jardine and Ashmead apply as previously recited. However, undisclosed is a shape memory alloy that is 55-Nitinol. Jackson et al. and Buehler et al. each teach the use of a 55-Nitinol shape memory alloy (see entire disclosures). Applicant is substituting one shape memory alloy composition for another as explicitly taught by the primary reference (see col. 2, lines 24-27 of Jardine). It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Jackson et al. or Buehler et al. to the Jardine and Ashmead disclosure and have a device with a different type of shape memory alloy.

4. Applicant's arguments are addressed as follows. Applicant's arguments directed to the PZT layer of Jardine and the issue of metallurgically bonding one layer to another have already been addressed in paragraph 2 above.

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5. Claims 1, 4-6, 9-10, 45, and 55 are rejected under 35 U.S.C. 102(b) as being anticipated by Mori et al..

Mori et al. disclose an armor comprising :

a) at least one energy absorbing layer of a shape memory alloy; 2, col. 7, lines 54-56

b) at least one second layer of a metallic material; 4

c) metallurgical bonding to the at least one energy absorbing layer; 7, col. 8, lines 34-46

d) a third plate. 1 or 5

6. Applicant's arguments are addressed as follows. It is argued that Mori et al. is directed to a shape memory alloy for coupling or joining two pipes together. This statement is accurate. It is further argued that the term limitation directed to "a ballistic armor" is not met by Mori et al. This is not accurate for two reasons. (1) Since the materials used in Mori et al. are stainless steel and TiNi alloy, the tube of Mori et al. must have some inherent effect upon any encountered ballistic projectile. This is the case regardless of what the intended design of Mori et al. is. (2) The claim limitation "a ballistic armor" is directed to the title of the invention and is not present in either the preamble of the claim or the claim body. As such, this claim limitation has no patentable weight. It is further argued that the weld 7 (col. 8, lines 34-38) is directed to the construction of the stainless steel double tube. This is also accurate. However, what applicant has claimed is "at least one second layer of a metallic material that is contiguous with and metallurgically bonded to the at least one energy absorbing layer". Clearly layer 4 (stainless steel) is contiguous with the energy absorbing layer 2. Further, it is metallurgically bonded to energy absorbing layer 2 via weld 7. However, it is welded indirectly to the absorbing layer 2 via the intermediary of stainless steel layers 5 and 6. With regard to the argument that the layer 4 is

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alienated from or removed from the absorbing layer 2. This is also accurate. Please note that all applicant has claimed is "... second layer of a metallic material that is contiguous with" and this is clearly met by layers 4 and 2 as arranged in Mori et al.. With regard to the issue of not being metallurgically bonded together because the two layers are not in contact with each other, please note that the layers are indirectly metallurgically bonded via the intermediary of layers 5 and 6. With regard to the argument that if layer 5 was considered to be the "second layer of a metallic material" and this layer is not metallurgically bonded, this layer is not being relied upon to meet this claim limitation, layer 4 is. With regard to the argument that the term "the ballistic armor" appears in the preamble of the claim, the term "the ballistic armor" does not interact with any of the preamble claim language but rather only serves to repeat the claim title. As such, it is not considered to be further limiting. This claim language merely repeats the title and does not serve to further limit the structure of the claimed invention. Further, the preamble claims "capable of withstanding penetration by a projectile impacting the armor". As such, there is no requirement that penetration by a projectile ever take place. All that is required is that the structure be **capable of withstanding** penetration. Clearly, the materials of Mori et al. are capable of withstanding penetration even if this is not their intended design.

7. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. in view of Jackson et al. or Buehler et al..

Mori et al. apply as previously recited. However, undisclosed is a shape memory alloy that is 55-Nitinol. Jackson et al. and Buehler et al. each teach the use of a 55-Nitinol shape memory alloy (see entire disclosures). Applicant is substituting one shape memory alloy composition for another as explicitly taught by the primary reference (see col. 5, line 54-col. 6,

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line 15). It would have been obvious to a person of ordinary skill in this art at the time of the invention to apply the teachings of Jackson et al. or Buehler et al. to the Mori et al. disclosure and have a device with a different type of shape memory alloy.

8. Applicant's arguments are addressed as follows. It is argued that Mori et al. fails to teach a ballistic armor or at least one energy absorbing layer that is contiguous with and metallurgically bonded to a second layer of a metallic material. In response, note the arguments in paragraph 6 above. It is further argued that Buehler et al. and/or Jackson et al. fail to teach a ballistic armor or at least one energy absorbing layer that is contiguous with and metallurgically bonded to a second layer of a metallic material. In response, Mori et al. and neither Buehler et al. or Jackson et al. are being relied upon to teach these claim features.

9. Claims 1, 4-10, 17, 45-46, and 55-58 are rejected under 35 U.S.C. 102(e) as being anticipated by Ashmead.

Ashmead discloses an armor comprising :

- a) at least one energy absorbing layer having an elastic strain      1, 3, 5; col. 2, lines  
deformation of at least 5%;      14-17
- b) at least one second layer of a metallic material;      11
- c) metallurgical bonding to the at least one energy absorbing layer; col. 3, lines 11-12
- d) a third plate of a metallic material.      13

10. Applicant's arguments are addressed as follows. It is argued that the aluminum material of Ashmed does not undergo "an elastic strain deformation of at least 5%". In response, please note paragraph 2, lines 11-17. Here Ashmed discloses 15% strain deformation in response to an applied stress. It is further argued that the Ashmead deformation is irreversible and therefore

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cannot be appropriately described as “elastic strain deformation”. In response, although the Ashmead device is not designed to bounce back to its original formation, it is described as being a “plastic deformation” (see col. 1, lines 54-57). Further, the energy absorbing components are spring shaped (see fig. 1) and composed of a material commonly used in metallic spring construction (aluminum). Consequently, there deformation can be appropriately described as an elastic deformation as claimed. With regard to the issue of “a ballistic armor”, since the materials associated with this device must inherently have some ballistic resistance to projectiles and since all that applicant has claimed is “capable of withstanding penetration by a projectile”, this claim limitation is inherently met.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ashmead in view of Vecchio.

Ashmead applies as previously recited. However, undisclosed is an attachment means that is diffusion bonding. Vecchio teaches an attachment means that is diffusion bonding to hold adjacent layers together (col. 19, lines 38-43). Applicant is substituting one attachment means for another as explicitly encouraged by the primary reference (see col. 3, lines 10-12 and 62-64 of Ashmead). It would have been obvious to a person of ordinary skill at the time of the invention to apply the teachings of Vecchio to the Ashmead device and have a device with a different type of plate attachment means.

12. Applicant’s arguments are addressed as follows. It is argued that the Ashmead device may be attached to permit sliding and that they may be bonded using a weaker fixing method such as polyurethane. In response, the device may also be fixedly attached by welding (see col. 3, lines 7-15). It is further argued that by contrast applicant’s device discloses laminating the



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metal layers together using heat and pressure to form a lightweight composite armor. In response, please note that all applicant has claimed is that one layer is “metallurgically bonded” to another and this is clearly met by Ashmead (col. 3, lines 7-12). It is argued that since the Ashmead disclosure allows for movement of the plates relative to each other, Vecchio would not be appropriately combined. In response, only one of the embodiments of Ashmead provides for sliding of the plates relative to each other. Vecchio is only being relied upon to teach a particular type of welding (diffusion bonding) as a replacement for the welding explicitly taught by Ashmead (col. 3, lines 7-12). With regard to the argument that Ashmead fails to teach an energy absorbing layer as claimed by applicant, this argument has already been addressed in paragraph 10.

13. Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Applicant's arguments filed 8/12/2005 have been fully considered but they are not persuasive. These arguments have been addressed in the preceding paragraphs of this Office action.

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

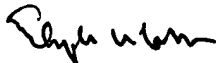
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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Johnson whose telephone number is 571-272-6877 and whose e-mail address is ([Stephen.Johnson@uspto.gov](mailto:Stephen.Johnson@uspto.gov)). The examiner can normally be reached on Tuesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6873. The Central FAX phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 800-786-9199.



**STEPHEN M. JOHNSON**  
**PRIMARY EXAMINER**

Stephen M. Johnson  
Primary Examiner  
Art Unit 3641

SMJ  
October 20, 2005